

be cultivated. Those who possess his earlier volume will require the supplementary one, and those who do not will, on reading this one, be anxious to possess it. The illustrations are very well executed, but have, as a rule, little connection with the text. The latter part of the book (dealing with bog-plants) is of especial value to those who are attracted to the practice of this frequently misunderstood style of decorative work. Among the alpines most heartily commended are *Saxifraga peltata*, *Oxalis enneaphylla*, *Hypericum reptans*, and *Hypericum coris*. The index contains several misprints.

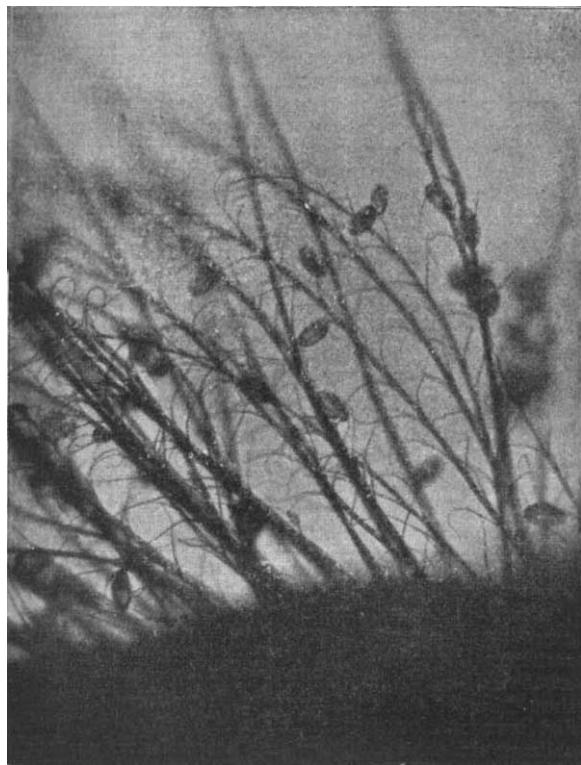
(4) This book is a series of detached simple essays on problems presented and solved by familiar plants. In matter and plan, the book compares somewhat closely with the delightful essays by Prof. Miall. The constitutional advantages of such weeds as camomile

of the flower from rain if they can cover it. If this is beyond their span, the method of acting as spouts to carry off the surplus moisture is an alternative rendered effective by the more horizontal position of the central florets on a raised disc. It is this adaptation which camomile effects, and such an explanation, whether new or not, is eminently a feature of the educational value of this work.

The relative evolutionary order and efficacy of colour and scent in relation to insect pollination of flowers is a point still in dispute; indeed, the dictum about cross-fertilisation being so eminently superior as a racial stimulus over self-fertilisation is coming up again for consideration. Most entomologists would, we think, consider scent of primary importance, and floral decoration as a means of directing the attracted insects to the right spot. The author, we notice, takes the view that the eye of the insect is caught first. It is, of course, almost impossible to write popularly on this subject without assuming a broad general conclusion as to its efficiency, which is, perhaps, hardly warranted. At least, the tendency to become dogmatic may blind us to a further explanation of these intricate associations between insects and plants that is as yet unknown. In this connection, we notice that, without stating definitely what insect pollinates the primrose, the author refers to the bee or the moth as doing it, in a misleading way. He would have been wiser to ask readers to notice what insect is really effective in the case of this plant. Neither honey-bees nor moths are known to be so. An interesting chapter is given to the markings of spotted orchis-leaves.

"The exposed part of the olive body of the viper, striped and spotted with dark markings . . . was almost identical with the appearance of some of the leaves of the orchis when similarly placed."

This resemblance is said in a footnote to be borne out by the occurrence of unspotted leaves of the plant in Ireland, where, of course, the viper is absent. But at present the suggestion, instead of throwing light on the subject, makes it more mysterious than ever, for it is surely more to the point to regard the viper as assimilating to the spotted leaves than *vice-versa*, and for that there is as yet no particle of evidence. We could have wished for more information on grasses. We notice also the strange word "trinary." The illustrations are very good.



Hairs from Body of a Bee, showing Pollen Grains entangled. From "Life-histories of Familiar Plants."

and coltsfoot, the relation between insect fertilisation and floral adaptations, the markings of leaves and the fertilisation of grasses, the evolution of the buttercup order, and the movements of sensitive leaves are some of the topics which Mr. Ward discusses upon pleasantly and illustrates clearly. On some points, indeed, he offers new hypotheses, and it is with them that we shall chiefly deal, premising that the whole volume is full of suggestion, and is based upon close observation.

Among the problems of diverse form and detail with which the book deals, the diverse behaviour of certain composites at nightfall is one to strike the most casual observer. Daisies mark the oncoming of night by closing, camomile by opening more widely. The explanation here given is the protection of the nectaries from dew- and rain-depletion of their store. The outer florets only successfully protect the disc

REFORM AT CAMBRIDGE.

FOR the last eighteen months the University has been inquiring into its management and constitution with the view of reform. At the end of his first year of office in October, 1907, the then Vice-Chancellor, the Rev. E. S. Roberts, the Master of Gonville and Caius College, spoke these words to the Senate:—

"I venture to touch now on dangerous ground. It is a matter of common knowledge that in a recent debate of the House of Lords some of the speakers urged His Majesty's Government to appoint a Royal Commission to inquire into the endowment, government, administration, and teaching of the Universities of Oxford and Cambridge and of their constituent colleges, in order to secure the best use of their resources for the benefit of all classes of the community. The Government, through their spokesman the Earl of Crewe, held that the moment was not opportune for appointing such a Commission, nor did he encourage the idea that a Royal Commission should be appointed in the immediate future.

"The attitude of neutrality incumbent by a whole-

some tradition on my office forbids that I should in any way prejudice or anticipate any opinion to which the University, or any part or parts of our body, may give expression formally or informally during what may be called years of grace. But I think I may hazard one observation. I believe that there is hardly a single suggested change which could not be effected by existing statutory powers, by internal reorganisation, and by cooperation of colleges. The opportunity is a unique one; shall we miss it?"

Since this address a considerable number of the members of the Senate who take an interest in the affairs of the University have been periodically meeting to consider how far a common basis can be arrived at for reform in the Constitution and Government of the University.

Cambridge has thus proceeded on different lines from Oxford. Within the last six months the Hebdomadal Council has from time to time brought forward Graces suggesting alterations in the Constitution of Oxford University. These have in almost all cases been thrown out. Now they are confronted with a comprehensive scheme, due to the energy and statesmanlike thought of a single mind, that of their Chancellor. The Council has accepted nine-tenths of his suggestions, and it now rests with Convocation and Congregation to see how many of these will be carried into effect.

Cambridge, on the other hand, has sought to find a point of reform which would be accepted by what we might term the moderate conservative. The leaders of both parties are agreed on certain questions, and it may be that, as the *Times* of May 10 says, "We are much mistaken nevertheless if at the present time the Cambridge method has not made more real and more substantial progress than that" of Oxford. Some reforms which Lord Curzon's "scarlet letter" suggests were long ago effected at the sister University, but in many of the most important features there is still a large margin for change at Cambridge, and we cannot but regret that the suggestions now put forward, however likely to be carried into effect, do not go a little farther.

The first of the three committees which has had these matters under consideration had as its duty the consideration of the Constitution and the Government of the University, and it has limited its report to two questions, (1) the reconstruction of the Electoral Roll, and (2) the functions of the Senate and of the Electoral Roll as reconstituted. Its object was to suggest a scheme which would give to the body of residents engaged in teaching, research, and administration a larger share than it at present possesses in the legislative action of the University. It is proposed that two houses should be established, one a body of residents, the other the Senate as at present constituted. Excepting in certain formal matters, and matters of wide and great importance, all kinds of business would come, in the first instance, before the residents; but in every case an appeal would lie to the Senate as a whole, provided that a sufficient number of the opponents of the proposal submitted were prepared to take the necessary steps. Should this reconstruction of the Electoral Roll be carried into effect, it is suggested that the smaller body should be termed "Congregation," and its decisions should be entitled "Graces," whereas the decisions of the larger body, the Senate, should be termed "Decrees."

Elaborate and careful regulations have been drawn up for the suggested alterations. They are full of detail, and need not be considered here. The main feature of the proposal is entrusting much greater powers to the resident members of the University

actually engaged in teaching than his hitherto been the case.

The second committee dealt with the question of scholarships, both of the colleges and the University. But as, at the present time, the question of college scholarships is under consideration by an inter-collegiate body in conference with the Oxford colleges, Committee No. 2 confined itself to the question of university scholarships, and its resolutions are now being considered by the Special Board for Classics.

The third committee was appointed to consider the relation of the colleges to the University and to one another. It has dealt with the following questions:—(A) The teaching for honours examinations. On this subject its suggestions involve (1) The reconstitution of the Special Boards of Studies so as to make them more fully representative of the teachers. (2) More detailed and careful consideration of the list of lectures in order to prevent overlapping. (3) An attempt to grade lectures so as to adapt them to students of different ability and attainment. (4) Some closer agreement than at present obtains as to the date of the students' return at the beginning of each term and the commencement of lectures.

Although at the present there is much cooperation between certain groups of colleges, the committee feels that this might be rendered more effective without interfering with the legitimate freedom of the colleges in arranging their own teaching. It also suggests that combination between colleges might be rendered more effective if the governing bodies informally consulted each other in making elections to fellowships or lectureships. In this way the needs of the different subjects might be more frequently and more fully taken into account.

In the last twenty years the number of professors in the University has risen from thirty-nine to forty-seven, of readers from six to twelve, of university lecturers from thirty-two to fifty-six. The number of demonstrators and teachers has also largely increased. In spite of this several wants remain unsatisfied, and others will certainly arise, and the committee refers to methods which it has discussed of raising money for further endowment.

The same committee has also (B) before it the question relating to the contribution of colleges to the common University fund. It is of opinion that colleges which contribute money for university purposes should be entitled to deduct from their taxable income any sum voluntarily so paid. It also holds that colleges in which fellowships are held by professors who are not professorial fellows, or by ex-professors, or by readers, or by certain university lecturers, should be entitled to deduct from their taxable income the sum of 20*l.* in respect of the fellowship held by each of such officers; and it makes other suggestions which would lighten the tax on colleges which are directly supporting University work. The committee is further of opinion that it is desirable that colleges should have power under their statutes to attach conditions to fellowships, such conditions to be defined within a specified time from the date of election; that in general a fellow should in the first instance be elected for a term of three years, and should be eligible for re-election for a further term of three years.

The same committee has also considered the necessary expense incurred by a student at Cambridge, and, after prolonged investigation, is of the opinion that the expenses of a careful student need not exceed 120*l.* for the academic year. This, of course, does not include expenses incurred in the vacation for travelling, or for clothes. If this calculation errs, it

is on the side of under-estimating. The amount must be somewhat increased for students of medicine and engineering, and for a non-collegiate student somewhat lowered, say to 80*l.*—90*l.* per annum.

Finally, although, perhaps, not carrying the weight of a document which has been considered by a representative committee, a circular issued by the Bursar of Trinity is regarded by many of the members of the Senate as one of the most important and valuable contributions to reform in the University. The matter with which it deals is difficult to explain shortly, but roughly it amounts to this:—A graduate, in taking his degree, pays high fees for the degree of B.A. and M.A.: after graduating, if he wishes to continue a member of the University and the college in which he was educated, he has to pay an annual sum to keep his name on the boards of the University or the college. It has always been a little difficult to explain to the young B.A. to what purposes this latter sum is devoted, and what, beyond a vote for the University Members of Parliament, advantages accrue to the graduate who remains a member of the University. There is thus a slight sense of irritation amongst those who keep their names on the boards, and in the case of those who do not compound this irritation recurs annually. On the other hand, those (and they are a large majority) who do not remain officially connected with Cambridge have the feeling that they have been "shown the door," and that no longer are they officially and technically members of the institution in which many of them spent the happiest years of their lives.

Mr. Innes's proposal is to reduce the degree fees to a nominal amount, and to abolish the fees for keeping names on the boards. If this were done, there would undoubtedly be a large increase in the numbers of graduates proceeding to the M.A. degree, and every graduate would remain a member of his college and of the University. To compensate for the loss of the fees which would thus be lowered or abolished, it is proposed that an additional charge should be imposed upon the student whilst in residence. If this could be effected, the whole body of graduates would become, and would remain, members of the Senate, and would, one cannot help believing, be more loyal and enthusiastic members of the University than is the case with those who have technically ceased to belong to their *Alma Mater*.

THE ROYAL SOCIETY'S CONVERSAZIONE.

A LARGE company assembled in the rooms of the Royal Society at Burlington House on Wednesday, May 12, on the occasion of the first of the two conversazioni given annually by the society. The visitors were received by the president, Sir Archibald Geikie, K.C.B., and great interest was shown in the exhibits of apparatus and results of recent scientific investigations. During the evening short demonstrations were given by Dr. A. E. H. Tutton, F.R.S., and Dr. Hans Gadow, F.R.S. Dr. Tutton's subject was crystals and colour: the revelation of crystal structure by polarised light. He gave a demonstration of the use of a new form of lantern polariscope to illustrate recent progress in knowledge of the internal structure of crystals. Magnificent colours were projected upon the lantern screen, though no coloured materials whatever were used to produce them, all the crystals employed being colourless. A new method of performing the Mitscherlich experiment with gypsum, without any extraneous heating of the crystal, was also shown. Dr. Gadow gave an account of the fauna, flora, and native races of Mexico.

The subjoined notes on the exhibits have been sum-

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marised from the official catalogue, and are here classified according to related subjects:—

Dr. G. E. Hale, For. Mem. R.S.: Photographs illustrative of work at the Mount Wilson Solar Observatory. (1) Three photographs of the sun, taken at the Mount Wilson Solar Observatory, April 30, 1908, showing (a) the photosphere, with sun-spots and faculae; (b) the flocculi of calcium vapour; (c) the flocculi of hydrogen, at a higher level in the solar atmosphere. The hydrogen photographs, which are made with the spectroheliograph, reveal the existence of cyclonic storms or vortices associated with sun-spots. (2) Photograph of the sun, taken on Mount Wilson, October 7, 1908, with the red line of hydrogen. The vortices surrounding two large spots in the northern and southern hemispheres appear to rotate in opposite directions. (3) Six photographs, showing the mounting of the 60-inch reflector of the Mount Wilson Solar Observatory and the mode of transporting the tube to the summit on a motor-truck. (4) Blue print, showing design for tower telescope, of 150 feet focal length, now under construction for use on Mount Wilson. An image of the sun, 16 inches in diameter, will be formed in a laboratory at the base of the tower. The spectrograph for studying this image will have a focal length of 75 feet, and will be mounted in a well beneath the laboratory.—*Solar Physics Observatory, South Kensington:* (1) Photographs and diagrams illustrating researches in solar physics and its relations with terrestrial meteorology. (2) Astrophysics. (i.) Spectrum of ϵ Ursæ Majoris; (ii.) spectra demonstrating temperature differences, or similarities, of typical stars; (iii.) laboratory spectra—(a) oxygen (vacuum tube); (b) erbium (arc); and (c) tungsten (spark); (iv.) spectra showing identification of hitherto unknown lines in the spectrum of ϵ Orionis.—

Mr. A. Fowler: Spectroscopic comparison of the star Mira Ceti with titanium oxide; to illustrate the origin of the characteristic bands of the Antarian or third-type stars.—

Mr. C. P. Butler: Thorp-Butler concave replica-grating spectroscope. Some years ago several applications of the Thorp plane replica diffraction gratings were exhibited, notably their use with an opera-glass for eclipse work. Recent experiments have shown that concave replica gratings can be made to give very satisfactory results, and by slight modifications of the design of mounting, this form of spectroscope may be employed for any investigation for which the ordinary spectroscope is fitted.—*The Astronomer Royal:* (1) Photographs and diagrams of the observations of the distant satellites of Jupiter and Saturn. (2) Photographs of comet ϵ , 1908 (Morehouse), taken with the 30-inch reflector at the Royal Observatory, Greenwich. (3) Tabular diagram showing the number and distribution of stars in the Greenwich section of the Astrographic Chart and Catalogue. The Greenwich section covers 2088 square degrees from the Pole to 26° N.P.D. Two series, each of 1149 photographic plates, were taken, one for the chart, with an exposure of forty minutes, and the other for the catalogue, with exposure of six minutes and twenty seconds, and the number of stars shown with each exposure has been counted. The total numbers are:—(a) with forty minutes, 719,000; (b) with six minutes, 178,600; (c) with twenty seconds, 38,373. The diagram shows the distribution of these stars in different parts of the area photographed, and the resulting star density.

Dr. W. J. S. Lockyer: Cloud photographs taken from balloon.—*Dr. Chree, F.R.S.:* Antarctic magnetic records and results.—*Prof. J. Milne, F.R.S.:* Seismograms of the Messina earthquake of December 28, 1908. These records were obtained at Shide, in the Isle of Wight, from two Milne horizontal pendulums. One of these recorded north-south motion and the other east-west motion.—*Prof. E. Hull, F.R.S.:* Admiralty charts along the coast of Europe and the British Isles, showing the continuation of the river-valleys under the ocean to depths of about 1000 fathoms (6000 feet).

Prof. J. Norman Collie, F.R.S.: A curious property of neon. Perfectly pure neon, when enclosed in a glass tube with mercury and shaken, glows with a bright orange-red colour. As neon does this at ordinary pressures, it appears to be different from other gases.—*Sir William Ramsay, K.C.B., F.R.S.:* Liquid radium emanation.